Waveshare D200

Waveshare D200 LiDAR Kit Instruction Manual

Model: D200

1. Product Overview

The Waveshare D200 LiDAR Kit features a 360° omni-directional triangulation lidar, designed for robot positioning, mapping, and obstacle detection. It offers an 8-meter ranging radius and supports software-controlled start-stop functionality to extend its operational lifetime. The LD14P lidar component utilizes high-performance light-sensitive CMOS technology for efficient, stable, and accurate data collection.

Image: The Waveshare D200 LiDAR Kit, showcasing the compact design of the main lidar unit.

Key features include:

- 360° omni-directional scanning for comprehensive environmental data.
- 8-meter ranging radius, enabling navigation in larger areas.
- Software control for starting and stopping the lidar, enhancing longevity.
- UART communication interface for integration with various systems.
- FDA Class 1 laser safety rating for human and pet safety.
- Robust performance in strong ambient light (up to 80000 Lux).
- 4000Hz ranging frequency for fast and accurate mapping.
- Thin, compact, and lightweight design for versatile robot integration.

Image: A hand holding the D200 LiDAR unit, highlighting its thin and compact form factor.

Image: An icon indicating Laser Safety FDA Class 1, emphasizing the low power infrared laser emitter for safety.

Image: A graphic representation of a CCD chip, illustrating the high-performance light-sensitive CMOS technology used in the LD14P.

Image: A collage of various application examples for the D200 LiDAR, including service robots, drones, quadruped robots, and mapping.

2. Package Contents

Verify that all items listed below are included in your package. If any items are missing or damaged, please contact customer support.

Image: The D200 LiDAR Kit, including the main lidar unit, a connection cable, and a USB-to-UART adapter, displayed next to its packaging box.

- D200 LiDAR Unit (LD14P)
- Connection Cable
- USB-to-UART Adapter

3. Setup Guide

Follow these steps to set up your Waveshare D200 LiDAR Kit.

3.1 Hardware Connection

1. **Connect the LiDAR Unit:** Connect the provided cable to the D200 LiDAR unit. Ensure the connection is secure.
2. **Connect to USB-to-UART Adapter:** Attach the other end of the cable to the USB-to-UART adapter.
3. **Connect to Host Device:** Plug the USB-to-UART adapter into a USB port on your host device (e.g., computer, development board).

Image: The D200 LiDAR unit connected to a laptop via a USB-to-UART adapter, illustrating the hardware setup for software control.

3.2 Software Installation and Configuration

Refer to the official Waveshare documentation or product page for specific driver installation and software development kit (SDK) instructions. Typically, this involves:

- Installing necessary USB-to-UART drivers for your operating system.
- Downloading the D200 SDK and example code.
- Configuring the serial port settings (e.g., baud rate 230400) in your application.

4. Operating Instructions

This section outlines the basic operation of the D200 LiDAR Kit.

4.1 Powering On and Initial Scan

Once connected and software is configured:

1. Ensure the host device provides stable DC 5V power to the LiDAR via the USB connection.
2. Initiate the LiDAR scan using the provided software or SDK commands. The LiDAR will begin rotating clockwise to perform a 360° scan.

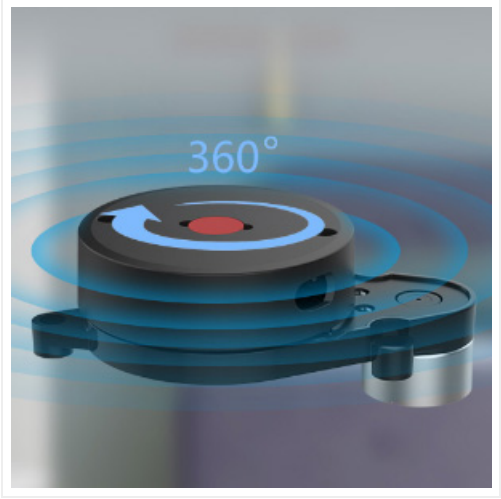

Image: An illustration showing the D200 LiDAR unit performing a 360-degree omnidirectional laser scan, with blue arcs indicating the scanning range.

4.2 Software Control and Data Acquisition

The D200 LiDAR supports software control for various functions:

- **Start/Stop Control:** Send specific commands via the serial port to start or stop the LiDAR motor, which helps in prolonging its operational life.
- **Data Output:** The LiDAR outputs point cloud data via UART. Your application will need to parse this data to reconstruct the environment map.
- **Ranging:** The device can sense objects within an 8-meter radius. The triangulation technology provides accurate distance measurements.

Image: A top-down view of the D200 LiDAR unit with concentric circles indicating an 8-meter ranging radius, demonstrating its environmental sensing capability.

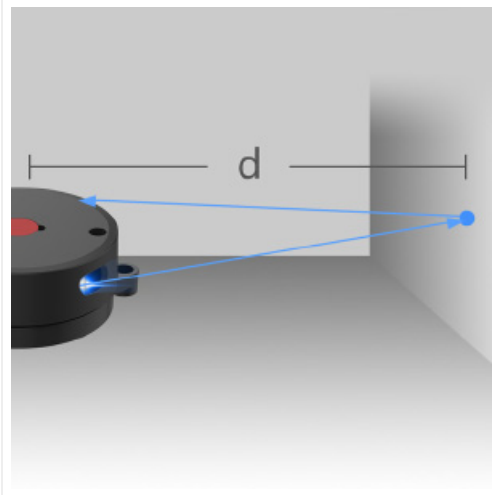

Image: A diagram illustrating the triangulation technology used by the D200 LiDAR to measure the distance 'd' to an object.

The D200 LiDAR is designed to operate effectively even in strong ambient light conditions, up to 80000 Lux, making it suitable for various indoor and outdoor applications. It also supports glass wall detection at specific angles, which can help reduce collisions in robotic applications.

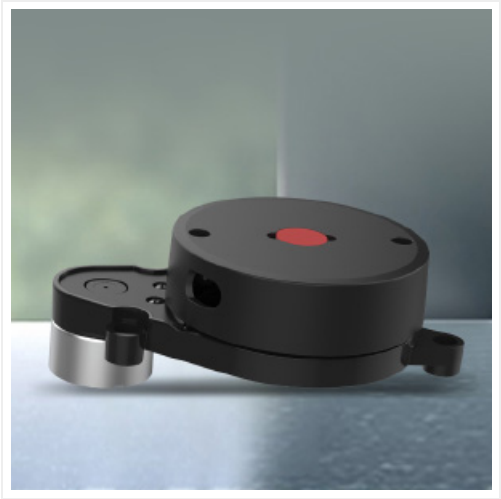

Image: The D200 LiDAR unit positioned in a brightly lit environment, demonstrating its strong ambient light resistance.

Image: The D200 LiDAR unit positioned near a glass wall, illustrating its ability to detect such surfaces.

5. Specifications

Detailed technical specifications for the Waveshare D200 LiDAR Kit (LD14P).

Specifications

RANGING DISTANCE(M)	0.1≤D≤0.5	0.5<D≤1	1≤D≤2	2≤D≤4	4≤D≤6	6≤D≤8
WHITE TARGET RANGING ACCURACY	±5mm	±10mm	±1.0%	±1.0%	±1.0%	±1.5%
BLACK TARGET RANGING ACCURACY	±7mm	±12mm	±1.2%	±1.2%	±1.5%	NA

Note:
1. The reflectivity of the white target is 80%, the reflectivity of the black target is 4.0% (tested by C84-III Reflectometer).
2. Raning accuracy: each point is within ±1° horizontal from the center of the acquisition baffle, calculate the average value of 30 consecutive data

RANGING RANGE	0.1 ~ 8.0m
SCANNING FREQUENCY	6Hz by default, 2 ~ 8 Hz externally controllable
SCANNING ANGLE	360°
RANGING FREQUENCY	4000 Hz
AMBIENT LIGHT RESISTANCE *	80000Lux (tested under sunlight condition)
WAVELENGTH	775 ~ 800nm (Typ 793)
COMMUNICATION INTERFACE	UART @ 230400
POWER SUPPLY	DC 5V±10%
POWER CONSUMPTION	≤ 1.5 W
OPERATING CURRENT	≤ 300 mA
WEIGHT	101 g
OPERATING TEMPERATURE	-10°C ~ 50°C
LIFETIME	2200 hours
DIMENSIONS (L × W × H)	96.3 × 59.8 × 38.80mm

* **Note:** This data was tested by Waveshare Lab, for reference only, the actual data may be affected by environmental factors

Image: A table detailing the specifications of the D200 LiDAR Kit, including ranging distance, accuracy, frequency, and power requirements.

Feature	Specification
Brand	Waveshare
Model Name	D200
Ranging Distance	0.1 - 8.0 meters
Scanning Frequency	6 Hz (default), 2 - 8 Hz externally controllable
Scanning Angle	360°
Ranging Frequency	4000 Hz
Ambient Light Resistance	80000 Lux (tested under sunlight condition)
Wavelength	775 - 800nm (Typ 793)
Communication Interface	UART @ 230400
Power Supply	DC 5V±10%
Power Consumption	< 1.5 W
Operating Current	< 300 mA
Weight	101 Grams
Operating Temperature	-10°C ~ 50°C
Lifetime	2200 hours
Dimensions (L x W x H)	96.3 × 59.8 × 38.8 mm

Note: Data was tested by Waveshare Lab. Actual data may vary due to environmental factors.

Application Examples

Service Robot

Drone

Shelf Visit Frequency

Quadruped Robot

Indoor Sports Platform

Smart Speaker/Camera

Educational Development

Multi Touch

Mapping & Modeling

Outline Dimensions

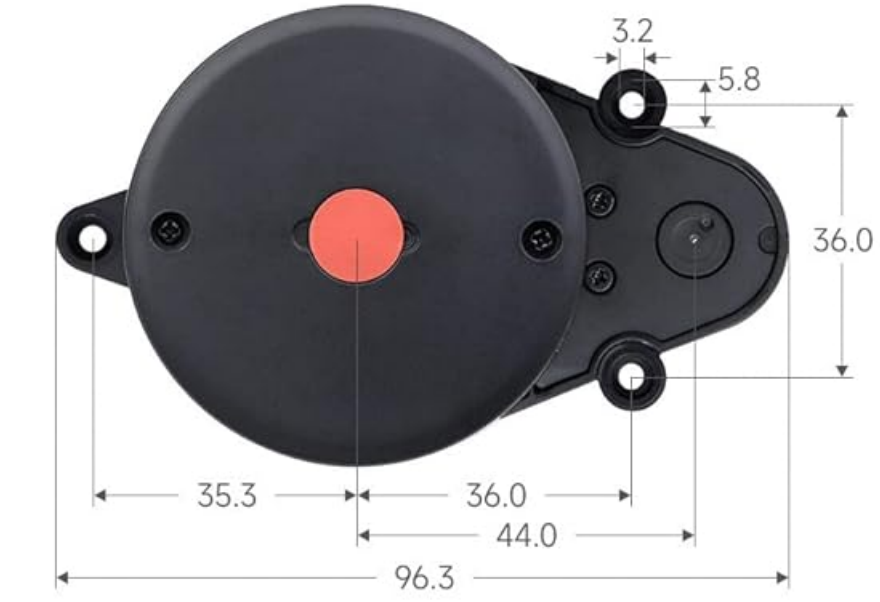

Image: Technical drawing showing the outline dimensions of the D200 LiDAR unit in millimeters.

6. Maintenance

Proper maintenance ensures the longevity and optimal performance of your D200 LiDAR Kit.

- **Cleaning:** Gently clean the optical window and the main body of the LiDAR with a soft, dry, lint-free cloth. Avoid using abrasive materials or chemical cleaners that could damage the surface.
- **Storage:** When not in use, store the LiDAR in a dry, dust-free environment, away from direct sunlight and extreme temperatures.
- **Handling:** Handle the LiDAR unit with care. Avoid dropping it or subjecting it to strong impacts, as this can affect its calibration and internal components.
- **Software Updates:** Periodically check the Waveshare official website for firmware or SDK updates to ensure you have the latest features and performance improvements.

7. Troubleshooting

If you encounter issues with your D200 LiDAR Kit, refer to the following common troubleshooting steps.

- **No Power/No Rotation:**
  - Verify that the USB cable is securely connected to both the host device and the USB-to-UART adapter.
  - Ensure the host device's USB port is providing sufficient power (DC 5V). Try a different USB port or power source.
  - Check the connection cable between the adapter and the LiDAR unit for any damage or loose connections.
- **No Data Output/Incorrect Data:**
  - Confirm that the correct serial port (COM port) is selected in your software application.
  - Verify the baud rate is set to 230400.
  - Ensure the USB-to-UART drivers are correctly installed on your operating system.
  - Check for any obstructions around the LiDAR's scanning window.
  - Restart your application and the LiDAR unit.
- **Inaccurate Ranging:**
  - Ensure the LiDAR's optical window is clean and free from dust or smudges.
  - Avoid operating the LiDAR in environments with extreme fog, smoke, or highly reflective surfaces that could interfere with laser measurements.
  - Confirm that the LiDAR is mounted stably and not subject to vibrations during operation.

For more advanced troubleshooting or persistent issues, refer to the official Waveshare support resources or contact their technical support.

8. Warranty and Support

The Waveshare D200 LiDAR Kit is covered by a standard manufacturer's warranty. Please refer to the warranty information provided with your purchase or visit the official Waveshare website for details regarding warranty terms and conditions.
For technical support, documentation, and software resources, please visit the Waveshare official website. You can typically find:

- Product Wiki/Documentation
- Downloads for SDKs, drivers, and example code.
- Contact information for technical assistance.

Always ensure you are using official resources for the most accurate and up-to-date information.